Wood Furniture Manufacturers:

How to Determine Your Obligations Under the National Emission Standards for Hazardous Air Pollutants (NESHAP): A Fact Sheet with Sample Calculations

Step 1: Do you meet the definition of a "major" wood furniture manufacturer?

The NESHAP is a national standard that applies to facilities that are engaged, either in part or in whole, in the manufacture of wood furniture or wood furniture components and emit or have the potential to emit (PTE) 10 tons/yr or more of any Hazardous Air Pollutant (HAP)[1] or 25 tons/yr or more of any combination of HAPs. These facilities are called "major sources" of HAPs. Major sources constructed on or before December 6, 1994, with actual HAP emissions below 50 tons in 1996, need to comply with the NESHAP by December 7, 1998. Major sources that emitted 50 tons or more in 1996 should have complied with the NESHAP by November 21, 1997. Major sources constructed after December 6, 1994 need to comply with the NESHAP immediately upon startup or by December 7, 1995, whichever is later.

"Wood furniture component" means any part that is used in the manufacture of wood furniture (drawer sides, cabinet doors, laminated tops, etc.). The manufacture or fabrication of foam seat cushions at a facility that does not engage in any other wood furniture manufacturing operation is excluded from the NESHAP. The wood furniture NESHAP covers products and product components manufactured under the following Standard Industrial Classification (SIC) Codes: 2434, 2511, 2512, 2517, 2519, 2521, 2531, 2541, 2599, and 5712. (The list of SIC codes is intended as guidance only. Whether or not your facility's operation must comply with the NESHAP depends on what products you manufacture and your facility's total HAP emissions, not your facility's SIC code.)

There are several ways you can become exempt from the wood furniture regulation, even if your potential to emit is over major source levels. These exemptions are discussed in Step 3 of this fact sheet. If you decide to use one of the exemptions in Step 3 to limit your potential emissions, you will not need to calculate your PTE (as shown in Step 2), but you will need to keep appropriate records.

[1] List of HAPs is attached to this fact sheet (from section 112(b) of the Clean Air Act).

Other regulations beyond the NESHAP may apply to your facility, including requirements regarding Volatile Organic Compounds (VOCs). (Note that potential to emit calculations are important for determining how VOC requirements apply to you; this fact sheet can serve as a guide for those calculations also.) You are responsible for determining what Federal, State and Local regulations apply to you. If you need assistance determining your responsibilities, see the State and Federal contacts listed at the end of the fact sheet.

Step 2: Determine your Potential to Emit

Potential to emit, or PTE, is the maximum capacity of a source to emit a pollutant under its physical and operational design capacity, as if:

- all equipment is operating 24 hours/day, 365 days a year (8,760 hr/yr);
- materials with the highest % HAP (Hazardous Air Pollutant) are used all the time; and
- no pollution control equipment is used[2].

To determine your PTE, you will need to assess all sources of HAP emissions at your facility, including activities unrelated to wood furniture manufacturing. Find the Material Safety Data Sheet (MSDS) or Certified Product Data Sheet (CPDS) for each product you buy (stains, sealers, wash-off solvents, thinners, lacquers, adhesives, etc.). If you do not have the MSDS or CPDS for each product, ask your vendor(s)/ supplier(s) to provide them to you. Vendors and suppliers of chemicals and other process materials are required by law to provide you with a MSDS for each product containing reportable hazardous ingredients. Look at Section II of the MSDS, usually titled "Hazardous Ingredients," to determine if any HAPs are used in that product. Collect the MSDSs for all products that contain HAPs.

[2] PTE is calculated without considering pollution control equipment unless the limitation or the effect the equipment would have on emissions is federally enforceable or practically enforceable. Practically enforceable limits are recognized under current EPA policy.

Now you are ready to calculate your potential to emit. The method illustrated in the following example for spraying operations shows one of several ways to calculate PTE. Other methods can be used depending on the operation: some methods rely on emission factors, others are based on the amount of coating used per product produced, and others depend on the actual amount of coating used and hours of operation scaled up to reflect your maximum capacity. If you have accurate monthly records on purchase, usage and hours of operation, you may be able to use a simpler method to calculate PTE. If you need assistance in determining the best method to use, contact the appropriate State representative listed at the end of this fact sheet. Be sure to calculate PTE for all activities at your facility — not only spraying, but cleaning operations, laminating operations, and so forth — that involve HAPs.

PTE is calculated on the basis of maximum capacity unless the facility obtains federally enforceable or practically enforceable limitations on its operations through, for example, a permit. Practically enforceable limits are recognized under current EPA policy. Contact your state to determine what permit conditions qualify as restricting PTE. If you have a permit that restricts your hours of operation or the amount of coating you can use, then that permit restriction defines your maximum capacity.

Also, some of your equipment may not be physically able to operate at 100% capacity due to "bottlenecking," points in a production line where the overall rate of production is unavoidably slowed (e.g., line speed is quite often a physical limitation on your process). You should examine your facility for any "bottlenecks" that physically limit the production rate and take this into consideration in calculating your PTE.

Example (hypothetical, for spraying operations):

"Wooden You Know" operates a facility that has two spray booths. Wooden You Know applies two types of stain in the first spray booth and one topcoat in the second spray booth. Each booth contains one gun with a maximum application rate of 3 gallons/hour. The two spray booths represent all of the emission points at Wooden You Know.

➲ Using Section II ("Hazardous Ingredients") data on the Material Safety Data Sheets (MSDSs) for both stains and the topcoat, determine the HAP content of each coating in lb/gal. HAP content is expressed in percent by weight on MSDSs; the challenge is to figure out how much HAP is in each gallon of coating. Section III ("Physical Property") of the MSDS shows the weight per gallon of each coating[3] in lb/gal. (If specific gravity is given instead of actual lbs/gal, multiply the specific gravity by 8.34 to get lbs/gal.) Table 1 shows the MSDS information for the two stains and one topcoat used in Wooden You Know's PTE calculations.

[3] Do calculations for the coating as applied. For example, if you are thinning any of your coatings, factor in the HAPs from the solvents you add to determine the HAPs in your coatings, as applied.

Table 1: MSDS data and HAP content calculations for Wooden You Know

	Spray Booth 1		Spray Booth 2
	Stain 1	Stain 2	Topcoat
From MSDS/CPDS:			
Density (lb/gal) of coating	7.40	6.23	8.23
Percent Xylene by weight	5-10*	5	10
Percent Ethyl Benzene by weight	5	3-5*	0
Percent Toluene by weight	0	10	5
Calculated from above information:.			
Xylene content (lb/gal) (density of coating) X (Xylene % by weight)	**0.74**	0.31	0.82
Ethyl Benzene (EB)content (lb/gal) (density of coating) X (EB % by weight)	**0.37**	0.31	0
Toluene content (lb/gal) (density of coating) X (Toluene % by weight)	0	**0.62**	0.41
Total HAP content in coating	1.11	**1.24**	1.23

* use higher percentage in range.

➲ Calculate your potential to emit for each HAP used in Spray Booth 1. First, evaluate the individual HAP content of Stain 1 and Stain 2. For each individual HAP PTE calculation for Spray Booth 1, use the amount of HAP present in the stain that has the highest content of that HAP (numbers are bold in Table 1). Then, calculate the PTE for Spray Booth 1 overall, using the stain with the highest total HAP content (Stain 2):

Xylene: (.74 lb xylene/gallon) X (3 gal/hr) X (8,760 hr/yr) X (1 ton / 2,000lbs) = 9.7 tons/yr
EB: (.37 lb ethylbenzene/gallon) X (3 gal/hr) X (8,760 hr/yr) X (1 ton / 2,000lbs) = 4.9 tons/yr
Toluene: (.62 lb toluene/gallon) X (3 gal/hr) X (8,760 hr/yr) X (1 ton / 2,000lbs) = 8.1 tons/yr

Total PTE in Spray Booth 1, based on Stain 2:
(1.24 lb HAP/gallon) X (3 gal/hr) X (8,760 hr/yr) X (1 ton / 2,000lbs) = 16.3 tons/yr

➲ Calculate the PTE for Spray Booth 2 in the same manner using the individual HAP content of the top-coat. Table 2 summarizes the PTE calculations for Spray Booth 2 and the total PTE for the facility.

Table 2: PTE for Wooden You Know

	Xylene	Ethyl Benzene	Toluene	Total HAP
Spray Booth 1 (calcs. above)	9.7 tons/yr	4.9 tons/yr	8.1 tons/yr	16.3 tons/yr
Spray Booth 2	10.8 tons/yr	0	5.4 tons/yr	16.2 tons/yr
Total PTE	**20.5 tons/yr**	4.9 tons/yr	**13.5 tons/yr**	**32.5 tons/yr**

➲ Next, calculate your actual emissions for this process. Wooden You Know uses 2,000 gallons of Stain 1, 2,000 gallons of Stain 2, and 4,000 gallons of Topcoat per year (total 8,000 gal/year or about 667 gal/month). You will need to calculate actual emissions of each HAP in each coating first to arrive at total emissions of each HAP and of all HAPs. To calculate your actual emissions, you will use the actual HAP content for each product found in Table 1.

Example calculation for Xylene column in Table 3 (numbers in bold):

Total actual emissions of Xylene from Stain 1 = (2,000 gal/yr used) X (0.74 lb/gal) = 1,480 lb/yr
Total actual emissions of Xylene from Stain 2 = (2000 gal/yr used) X (0.31 lb/gal) = 620 lb/yr
Total actual emissions of Xylene from Topcoat = (4000 gal/yr used) X (0.82 lb/gal) = 3,280 lb/yr

➲ **Repeat this calculation for each HAP in each product:**

Table 3: Actual Emissions

	Xylene	Ethyl Benzene	Toluene	Total HAP
2,000 gal/yr (Stain 1)	**1,480 lb/yr**	740 lb/yr	0	2,220 lb/yr
2,000 gal/yr (Stain 2)	**620 lb/yr**	620 lb/yr	1,240 lb/yr	2,480 lb/yr
4,000 gal/yr (Topcoat)	**3,280 lb/yr**	0	1,640 lb/yr	4,920 lb/yr
Total HAP (lb/yr)	5,380 lb/yr	1,360 lb/yr	2,880 lb/yr	9,620 lb/yr
Total HAP (ton/yr)	2.69 ton/yr	0.68 ton/yr	1.44 ton/yr	4.81 ton/yr

➲ **PTE and actual calculations should be done for each activity at the facility.** Please keep in mind that your PTE must account for emissions that could come from any unused equipment that might not be included in determining the facility's actual emissions.

➲ **Draw a conclusion: based on your PTE, are you a "major source"?**

Wooden You Know would be classified and regulated under the NESHAP as a major source, since it has the PTE (Table 2) over 25 ton/yr of HAPs and has the PTE over 10 tons of both Xylene and Toluene. (Either PTE would by itself classify Wooden You Know as a major.) The fact that Wooden You Know's actual emissions (Table 3) are below the thresholds does not help unless Wooden You Know can meet one of the criteria below.

Step 3: The NESHAP contains three exemptions. If your PTE is over major source levels, can you meet any of the following criteria in order to avoid the NESHAP requirements?

1. Are you an incidental wood furniture manufacturer (primarily engaged in the manufacture of products other than wood furniture) that uses no more than 100 gallons per month of finishing material and adhesives in the manufacture of wood furniture? If so, you are exempt from this NESHAP, but would still be classified as major source of air toxics emissions, and would be required to obtain a title V permit from your permitting authority.

Wooden You Know does not qualify as an incidental wood furniture manufacturer for two reasons: 1) Wooden You Know is only engaged in wood furniture manufacturing; and 2) Wooden You Know uses more than 100 gal/month of material.

If you do qualify for this criterion, you must maintain coating and adhesive purchase or usage records documenting that you use less than 100 gallons of finishing materials and adhesives per month. Please note that if at a later date you can no longer meet this exemption, you will be subject to the NESHAP unless you can qualify for another exemption or restrict your PTE in some other way.

2. Do you use less than 250 gallons per month (or less than 3,000 gallons per rolling 12-month period) of coating, gluing, cleaning, and washoff materials, including materials used for operations other than wood furniture manufacturing? Do your finishing materials, adhesives, cleaning solvents and washoff solvents account for at least 90 percent of the annual HAP emissions at your facility? Include <u>all</u> coating, gluing, cleaning and washoff material, whether those materials contain HAP or not. If you answer yes to both questions and maintain appropriate records, you are considered an area source and are not subject to the NESHAP.

Wooden You Know does not qualify for this criterion, since it uses 667 gal/month and 8,000 gal/yr of coating.

If you do meet this criterion you must maintain records of the amount of these materials used or purchased on a monthly and/or rolling 12-month basis to document that you are an area source. Please note that if at a later date you can no longer meet this exemption, you will be subject to the NESHAP unless you can qualify for another exemption or restrict your PTE in some other way.

3. Do you emit no more than 5 tons per rolling 12-month period of any one HAP and no more than 12.5 tons per rolling 12 month period of any combination of HAPs, AND are at least 90% of your plant-wide HAP emissions associated with the manufacture of wood furniture? If so, and if you maintain appropriate records, you are considered an area source and are not subject to the NESHAP.

From Table 3, we see that Wooden You Know's HAP emissions are 2.69 tons/yr of Xylene, 0.68 tons/yr of Ethyl Benzene, 1.44 tons/yr of Toluene and 4.81 tons/yr all of HAPs; each amount is below the exemption thresholds. Therefore, Wooden You Know meets the first part of this criterion as long as it documents that during the 12 month period prior to the compliance date, its actual emissions were below the levels stated above. To continue to qualify, Wooden You Know must maintain emission levels below the limits stated above during every subsequent 12-month period, and keep records to document

that. Since wood furniture coating is the only activity at Wooden You Know, it meets the second part of this criterion too. If your facility engages in multiple activities (e.g., both wood furniture and metal coating), you must examine and meet the 90% criterion and keep records documenting that at least 90% of your plantwide HAP emissions are from wood manufacturing. Please note that if at a later date you can no longer meet this exemption, you will be subject to the NESHAP unless you can qualify for another exemption or restrict your PTE in some other way.

➲ Note: Federal regulations specify what kinds of records you should keep to document that you are qualified for an exemption. See 40 CFR Part 63 Subpart JJ Section 63.800 for details, or contact EPA for more information.

Step 4: If I cannot meet one of the criteria in Step 3, how can I limit my PTE to avoid the NESHAP requirements?

If your actual emissions are below major source thresholds but your potential emissions are above and you cannot qualify for one of the criteria discussed above, you may want to consider:

Evaluating pollution prevention as a way of reducing your potential emissions. For example, you could switch to low-solvent or non-solvent based coatings. The finished appearance of alternative coatings, such as aqueous-based and UV-cured, has improved in recent years and may be worth re-evaluating even if you looked at alternative coatings in the past. Another option is to increase product transfer efficiency by switching away from conventional air guns. There are many alternatives to conventional air guns: High Volume Low Pressure (HVLP) guns, airless guns, air-assisted airless guns and flatline continuous coating systems. In the example above, since the stain spray booth and the topcoat spray booth are the only emission points for the facility, changing to a waterborne topcoat that contains no HAPs would reduce the PTE for the facility below major source levels. Even if your PTE is below major source levels, evaluating pollution prevention often makes good business sense. A pollution prevention assessment can often identify additional cost-effective emission reduction and process efficiency opportunities. For more information on pollution prevention opportunities, you may want to obtain a copy of Wood Furniture: The Clean Air Act Amendments of 1990 and Pollution Prevention Opportunities by contacting EPA (see end of this fact sheet).

Contacting your state permitting authority to see if you could obtain a federally enforceable or practically enforceable[4] limit on your operations, perhaps just limiting your potential operations to actual levels. Practically enforceable limits are recognized under current EPA policy. Many permitting authorities issue such permits to limit process rates, hours of operation or amount of material processed. You will be required to keep records under such a permit. Limits on your potential to emit must be in place by the compliance date that applies to your facility, or your facility will have to comply with the NESHAP for the life of the facility.[5] Be sure to allow your state agency plenty of time to process your application.

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[4] Practically enforceable limits are recognized under current EPA policy. Contact your state to determine what permit conditions qualify as restricting PTE.

[5] Based on EPA's "Potential to Emit for MACT Standards - Guidance on Timing Issues" policy memorandum issued on May 16, 1995.

Please refer to the back of this page to find out where to get more information and for a list of state and federal contacts.

For more information:

Your state environmental agency may have additional requirements that regulate the percent of VOCs in coatings, or other air requirements that restrict emissions at your facility. Refer to your individual State for more information on state regulations.

Vermont DEC
Brian Fitzgerald
(802) 241-3848

Maine DEP
Ellen Doering
(207) 287-2437

New Hampshire DES
Melinda Treadwell
(603) 271-1370

Massachusetts DEP
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Rhode Island DEM
Gina Friedman
(401) 222-2808, Ext. 7016

EPA has made available several documents of interest to the wood furniture industry, including Wood Furniture: The Clean Air Act Amendments of 1990 and Pollution Prevention Opportunities, on EPA's unified air toxics website http://www.epa.gov/ttn/uatw/wood/riwood.html.

For a paper copy of Wood Furniture: The Clean Air Act Amendments of 1990 and Pollution Prevention Opportunities, or for additional information, contact **US EPA's New England Environmental Assistance Team at 1(800) 906-3328**. If calling outside of New England, please call (617) 565-9224.